

# A Video Camera Technique To Monitor Piping Plover and Least Tern Nests on the Missouri River in North Dakota



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## INTRODUCTION

## METHODS

- The establishment of dams to control water flow on the Missouri River disrupted the natural flood process that created habitat favorable for the federally endangered Least Tern (*Sternula antillarum*) and the threatened Piping Plover (*Charadrius melodus*) to successfully create nests, hatch chicks and fledge juveniles (Jacobson et al. 2009, Catlin et al. 2011).
- Correct determination of nest fates and predators is crucial to understand population dynamics and improve recovery plans.
- With advancements in quality, size and cost reduction of video equipment, it is possible to monitor multiple nests of a population throughout the reproductive season to accurately identify nest fates and predators (Ribic et al. 2012).



Fig 1. Tern (top) and plover (bottom) nests

Video was recorded by a DVR board stored in a waterproof box buried at least 25 m away from the nest with a 12-v battery and a cable that connected to the camera.



Fig 3. Completed DVR box and battery setup

Miniaturized surveillance cameras, camouflaged to blend into the surrounding sand substrate, were secured to 1.27 cm dowel rods and positioned 1 m from nests.



Fig 2. Completed camera setup

SD cards and batteries were exchanged every 3-4 days to continuously monitor nests throughout the incubation and hatching periods.



Fig 4. Completed camera system



## DISCUSSION

- Small sample sizes (1 year of data) preclude definitive conclusions.
- Nests fated as probable successful by researchers were fated as successful by camera footage.
  - Accurate determination of fate is crucial to measuring nest success and formulating effective management plans for both species.
- Installation of cameras did not affect apparent nest success.
- Cameras successfully documented 3 predators of plover nests.

## FUTURE PLANS

- A catalogue of video footage that monitors multiple tern and plover nests annually provides the opportunity to analyze:
  - Potential impacts of researcher disturbance on nest attendance patterns and survival
  - Behavioral patterns that may affect nest survival
  - Hatch synchrony of chicks
  - Temperature effects on behavioral and attendance patterns at the nest
- A nest survival model based on comprehensive behavioral covariates will increase understanding of how adults allocate time spent at the nest and identify any relationships between behavior and productivity.
- With global climate change, the examination of possible effects that sand temperatures inflict on nesting behavior may be critical to development of future management actions.
- Knowledge about hatch synchrony of a clutch may reduce researcher presence at the nest to band chicks and determine fate.

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## LITERATURE CITED

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## PRELIMINARY RESULTS

### Nest Fates

PLOVERS		Fate From Camera Data				
Fate from Nest Monitoring	Success	Probable Success	Failed	Probable Failed	Unknown	
Success	13					
Probable Success	4					
Failed			12		1	
Probable Failed						
Unknown						

  

TERNS		Fate From Camera Data				
Fate from Nest Monitoring	Success	Probable Success	Failed	Probable Failed	Unknown	
Success	8					
Probable Success						
Failed			2		1	
Probable Failed						
Unknown						

Reasons for Nest Failure

REASONS FOR NEST FAILURE	PLOVERS				TERNS			
	DEPREDATED	ABANDONED	DESTROYED	UNKNOWN	DEPREDATED	ABANDONED	DESTROYED	UNKNOWN
	8	3	1	1	0	2	0	1

  

REASONS FOR NEST FAILURE	PLOVERS		TERNS	
	CAMERA	NON-CAMERA	CAMERA	NON-CAMERA
Apparent Nest Success	56%	56%	73%	86%



## OBJECTIVES

- Record the incubation and hatching stages of the plover and tern reproductive process with a newly developed miniature camera and DVR system to:
  - Compare fate determined by field researchers to nest fate confirmed by camera.
  - Determine the effect of researcher activities on nesting behaviors.
  - Create a video archive to explore other nesting behaviors and predator interactions.

## STUDY SITE

